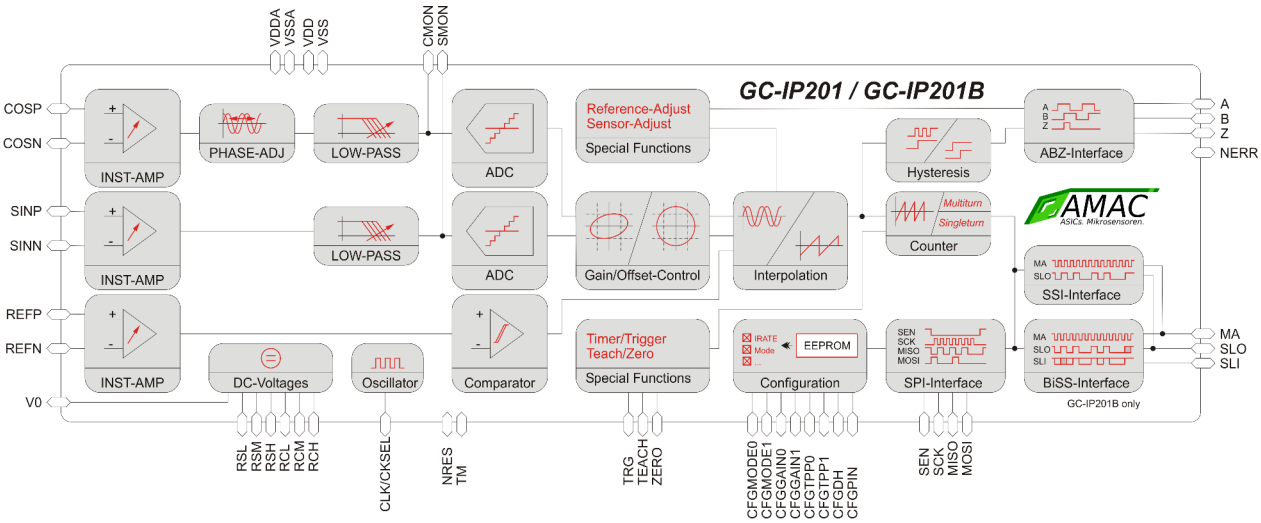
Interpolation Circuits GC-IP201 and GC-IP201B

Characteristics:

- **Interpolation rate 20 ... 256**
- **Input frequency max. 440kHz**
- **Adjustable input low pass filter 10kHz … 450kHz**
- **Constant delay time of 2.4µs for all resolutions**
- **AMAC-specific internal gain and offset control**
- **Output signals: ABZ, SPI, SSI, BiSS (GC-IP201B only)**
- **EEPROM, multiturn counter, reference mark adjustment**
- **Power supply 3.3V / 5V***
- **Temperature range: -40°C … +150°C**

The interpolation circuits *GC-IP201* and *GC-IP201B* serve to increase the resolution of incremental position and angular measuring systems with sinusoidal output signals. The input signals are subjected to an AMAC-specific internal gain and offset control and the signal period will be divided up to 256 times. The ICs comprise three instrument amplifiers with adjustable gain factors. Incremental encoders which possess a voltage interface and measuring bridges can be connected directly. Sensors with current interface and photodiode-arrays are adapted by a simple external circuit. The noise of the sensor signals is prevented by a switching analog filter. Additionally, a digital hysteresis can suppress the edge noise of the output signals at low input frequencies and at standstill. The quality of the signals issued by the sensors is monitored in the ICs. For that purpose it is possible to activate 9 sources separately producing an error signal. The four integrated output interfaces ABZ, SPI, SSI, BiSS (GC-IP201B only) and further features like the multi-stage trigger signal processing, integrated timer, integrated multiturn counter, the processing of distance coded reference marks, the possibility, to adjust the reference mark as well as adjustment and storage of the zero position make the IC suitable for direct use of the ICs in industrial controls or in fast multi-channel positioning measuring systems. With these features the ICs are also prepared for use in absolute positioning measuring systems.



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Technical Data:

Interfaces	
Analog input	Sinusoidal / cosinusoidal / reference (index) signals; differential or single-ended Adjustable amplification for 660mV$_{PP}$ / 330mV$_{PP}$ / 160mV$_{PP}$ / 50mV$_{PP}$ (corresponding to 1V$_{pp}$ ... 80mV$_{pp}$ at 5V) Input frequency max. 440kHz for all resolutions
ABZ	90° square-wave sequences (A/B/Z) Adjustable width of zero signal Z to ¼ or 1 period A/B Service signals for sensor adjustment
SPI	30-bit counter value / 16-bit multiturn value / 9-bit sensor state Up to 25MHz, compatible to standard-SPI 16 bit Up to 500 000 measurement values per second Signal filter for suppression of disturbances
SSI and BiSS	30-bit counter value / 16-bit multiturn value / 2-bit sensor state Gray code / binary code Adjustable timing, SSI ring operation
Interpolation / Signal Processing	
Interpolation rate	256, 200, 160, 128, 100, 80, 64, (50), 40, 32, (25), 20
Signal correction	AMAC-specific digital controller for the offset, control range ±10% of the standard amplitude AMAC-specific digital controller for the amplitude, control range 60% … 120% of the standard amplitude Digital potentiometer with 15 steps for phase correction; selectable range ±5° or ±10°
Suppression of disturbances	Selectable low pass filter 10kHz, 75kHz, 200kHz, 450kHz Digital hysteresis for suppression of the edge noise at the output (0 … 7) Selectable minimum edge distance at the output
Reference mark adjustment	Selectable reference mark position with 32 steps 0° … 360° Definition of the optimum reference position via SPI or service signals Processing of distance coded reference marks Measured-value trigger at the reference mark position
Miscellaneous	2-stage measured value trigger; programmable timer (3.2µs … 420ms) Zero-signal and teach-signal for adjustment and storage of zero position of the sensor Multiturn counter Integrated EEPROM for configuration
Important Characteristics	
Package	QFN40 (6mm x 6mm)
Operating Voltage	3.3V / 5V*
Temperature Range	-40°C … +150°C

**Configuration of 5V-systems possible via Level-Shifter GC-LS*

Ordering Information:

Product Type	Description	Article Number
GC-IP201	Interpolation circuit GC-IP201, QFN40	PR-44201-00
GC-IP201B	Interpolation circuit GC-IP201B incl. BiSS-Interface, QFN40	PR-44202-00
IPE201	Interpolation Unit with GC-IP201B (standard configuration ABZ)	PR-46201-00
GC-LS	4-channel / analog Level-Shifter 5V to 3.3V, package TBD	PR-44500-00

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